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WATER WATCH WISCONSIN

Manure spraying under scrutiny

By **Ron Seely** April 27, 2014

Wisconsin Department of Natural Resources

A center pivot manure irrigation system is used to spread manure on a Wisconsin corn field.

Scott Murray did not want to leave the home in rural Juneau County where he and his family had lived for more than 20 years. But with the house surrounded on three sides by manure irrigation systems, life had become a nightmare.

“It even got into the walls of our home,” Murray said of the liquid manure spray that drifted onto his property from the Central Sands Dairy across the road. “It was an ammonia smell. It hurt so bad even to breathe.”

In 2011, the Murrays sold their house and moved.

The buyer?

Central Sands Dairy.

“And it’s a good thing,” Murray said, “because my property wasn’t worth a nickel.”

Life for the Murrays, along with other Wisconsin families, has been disrupted by the relatively rare practice in Wisconsin of using water irrigation systems to spray liquid manure on farm fields.

Now the issue has taken on new urgency as more large dairy farms consider using the practice. A work group formed by the state Department of Natural Resources and run by the University of Wisconsin-Extension is completing a study and beginning to weigh whether to toughen regulation of manure irrigation. Its initial report is due out by fall. The practice is regulated under current law with restrictions on spraying too close to homes and wells.

Some research suggests that the plethora of chemicals and pathogens found in liquid manure can have serious health impacts, ranging from respiratory disease to potentially lethal antibiotic resistant infections. Opponents fear wider use of manure irrigation will increase the risk of human illness and drinking water contamination.

Critics also question the ability of the DNR, relying mostly on citizen complaints and

self-reporting by the huge dairies, to adequately regulate a practice that has already been shown to pollute waters and drive people from their homes.

Such concerns have prompted officials in Wisconsin's Adams County to pass a moratorium against the practice.

It is also an issue elsewhere in the country.

In Minnesota, according to the Wisconsin DNR, 10 counties prohibit manure irrigation.

In North Carolina, 95 percent of the swine farms use manure irrigation. Fish kills and pollution prompted state officials to ban the practice on new or expanding CAFOs, and farms now must follow much more restrictive regulations. In Michigan, a company shut down its mega-farms (http://nocafos.org/news.htm) after violations and lawsuits related to the flawed use of manure irrigation.

Applying liquid manure to fields using pipelines and farm irrigation systems is less expensive than trucking manure and applying it with traditional land-spreading rigs. Proponents also say it is less likely to pollute because it allows for more precise application of manure, which provides necessary nutrients to the soil. And runoff is less likely when manure can be applied when crops are in the field, they say.

Currently, 14 of the state's industrial-sized dairy farms, also called Concentrated Animal Feeding Operations, or CAFOs, use manure irrigation, according to the state DNR.

That number could rise dramatically. Wisconsin has 258 dairy farms categorized as CAFOs.

"We're getting more and more requests in the department to use the technology," said Andrew Craig, a DNR water resources specialist who is working with the manure irrigation group.

The issue is tied inextricably to the controversial spread of CAFOs across the Wisconsin landscape. The farms produce overwhelming amounts of manure and have angered and frustrated nearby residents who feel they have little control over the growth and operations of the industrial farms. Cattle on Wisconsin farms produce as much waste each year as the combined populations of Tokyo and Mexico City, according to calculations by Gordon Stevenson, a retired former chief of the DNR's runoff management section.

The DNR advisory work group is examining studies of manure irrigation, weighing the still-uncertain science of potential impacts. The group's role is advisory and carries no legal weight but the panel could eventually recommend best management practices or changes to regulations.

But, in the meantime, the DNR continues to grant approvals for CAFOs to use manure spraying, once even exempting an applicant from current regulations, according to a legal challenge. Critics doubt the work group will ban the practice, given that the push to expand it is coming from big agricultural interests.

"I get the feeling that it's just a matter of how we're going to do it, not whether it is going to be done," said Lynn Utesch, a member of the work group who runs a small farm in Kewaunee County and is a vocal opponent of CAFOs.

Maximize the benefits

In one of the most controversial permits, the DNR approved the use of manure irrigation by Ebert Dairy Enterprises in Kewaunee County. With a recent expansion, the dairy will generate and spread or spray more than 55 million gallons of liquid manure and wastewater a year on fields.

According to a legal challenge from 10 Kewaunee County residents, the DNR exempted the operation from safeguards in current law, including a rule that prevents spraying on fields

with soils that are too shallow. Craig denied that such exemptions were granted. He argued that soil depths on the fields in question are adequate and that exemptions were not necessary.

Ken Genskow, an associate professor at the University of Wisconsin-Madison who chairs the work group, said it is focusing closely on the issue of manure irrigation rather than broader CAFO issues. He said the group is committed to a thorough, objective review, weighing benefits and potential health and environmental impacts.

“The trick with this,” Craig added, “will be to maximize the benefits and minimize the problems.”

“Admittedly, on its face it sounds like a bad idea,” Genskow said of manure irrigation. “It’s an issue people make up their minds about before they know everything about it.”

Genskow said he has come to appreciate some of the benefits of the practice, including the ability to better control the application of manure.

This is actually the second incarnation of the study group. It was reorganized by the DNR last year after critics complained that the first panel was stacked with CAFO operators and other supporters of manure irrigation. The new 18-member panel, which has been meeting since July, includes scientists, public health officials, agronomists, CAFO operators and their critics, such as Utesch.

The study group includes Kenn Buelow, dairy manager and part owner of Holsum Dairies, two CAFOs in northeastern Wisconsin near Hilbert. Holsum was named a 2012 winner of the U.S. Dairy Sustainability Awards. Buelow said the farm favors center-pivot manure irrigation because it is cheaper and better for the environment.

Because manure is piped to the irrigation units, the use of large trucks that damage roads is unnecessary, Buelow said. He also noted that manure can be applied to growing crops during the growing season instead of being spread on bare fields, reducing the chances of excess manure running into streams and seeping into groundwater.

“I think there are a lot of benefits for water quality,” Buelow said.

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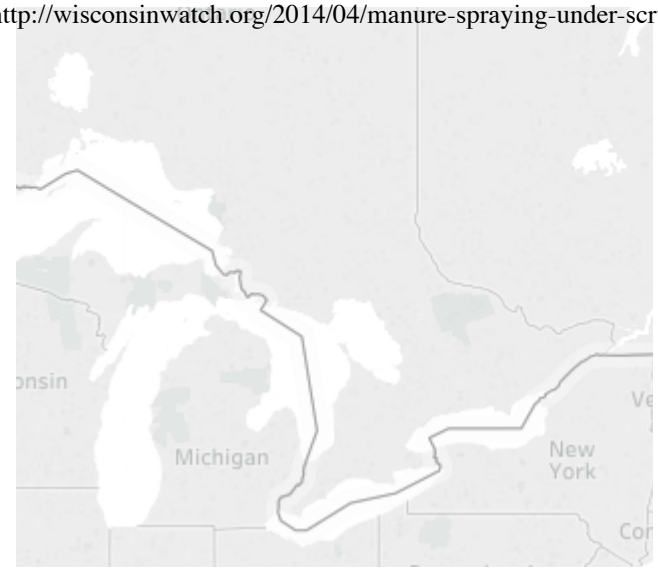

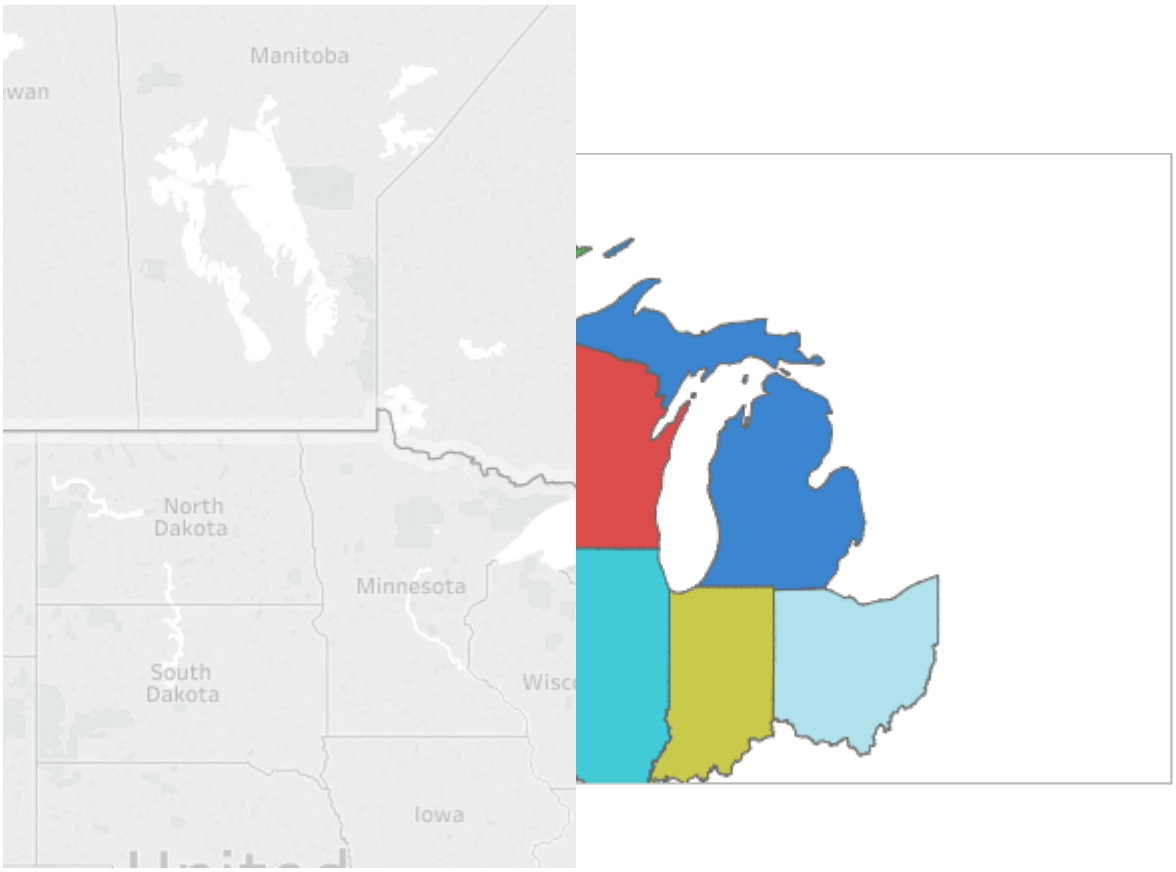

Undo

The danger of over spraying

But critics and even some proponents of manure irrigation say the practice can threaten water supplies. A 2007 report (http://ianrpubs.unl.edu/live/ec778/build/ec778.pdf) from the University of Nebraska-Lincoln Extension that was generally favorable toward center-pivot

systems said this was a major concern.

"Though most center pivots are capable of applying water at rates similar to land applicators," the authors found, "the temptation to use the system to supplement rainfall with liquid animal manure could result in over application of manure."

Rick Dove, an environmental activist who belongs to a conservation group called the Waterkeeper Alliance (http://waterkeeper.org/), fought the use of manure spraying in North Carolina for years. He said the spray units there were being used by hog farmers even when fields were saturated.

"It couldn't be absorbed," Dove said of the manure. "There was no place for them to spray, yet they were spraying everywhere. We had terrible fish kills."

Part of the problem stems from the lake-sized CAFO storage lagoons that are sometimes filled near to overflowing with the liquid manure from thousands of animals. This creates pressure on operators to find uses for the waste. Noted the Nebraska report, "some producers regard manure distribution as a 'waste disposal' problem rather than distribution of a valuable resource."

The lagoons come with their own problems. A rupture of one such lagoon in North Carolina spilled more than 20 million gallons of liquid manure (http://ehp.niehs.nih.gov/121-a182/) into the nearby New River, killing millions of fish.

In Michigan, where manure irrigation is used on both dairy and pig CAFOs, excessive application has been a recurring problem, according to Lynn Henning, an anti-CAFO activist.

Henning, who was awarded the prestigious Goldman Environmental Prize (http://www.goldmanprize.org/home) for her efforts to force more oversight of big farms, spoke to the Wisconsin manure irrigation study group at its April meeting. She said several of Michigan's large-scale farms have been cited for over application of liquid manure while using manure irrigation.

In one instance, according to the Michigan Department of Environmental Quality, the Vreba-Hoff dairies were cited (http://nocafos.org/v-hcomplaint12-09.pdf) in 2008 and 2009, including 707 instances over 128 days where the farms irrigated waste at concentrations more than twice the amount allowed.

Henning said manure irrigation has caused so much damage that she would advise banning the practice, something Craig said the DNR would prefer not to happen. Henning recommended operator certification, testing of irrigated manure for chemicals and pathogens, and required groundwater and well testing in areas near the irrigation units.

Buelow, the Wisconsin CAFO operator and work group member, agreed that excessive application can be a problem. "That's really an operator thing," he said. "It's easier to throw a switch and keep applying. That's probably why it happens."

Managing manure

For Scott Murray and his family, being surrounded by Central Sands Dairy's manure irrigation systems proved too much to bear. The smell and the ammonia from the liquid manure was so bad that his son refused to bring Murray's grandchildren to visit.

"He said, 'Dad, I'm not bringing the kids over here anymore,' " Murray

(http://u6efc47qb7f1gsvo6kf9kfdcn.wpengine.netdna-cdn.com/wp-content/uploads/2014/04/single-nozzle-manure-irrigation-system.jpg)

Another form of manure irrigation involves using a single nozzle system such as this one. Courtesy of Wisconsin Department of Natural Resources

recalled. "And we had to move because my grandkids are my life."

Like Murray, Diane Miller lived across the street from Central Sands Dairy in Juneau County, not far from the city of Nekoosa. Miller and her husband, Ray, lived in the home for years before Central Sands Dairy was built on the site of a former vegetable farm.

Life changed for the Millers after the arrival of Central Sands in 2007, along with its thousands of cows and large manure storage lagoon. Miller recalled a smell almost too powerful to endure.

"We had so many flies it was like that scene from 'The Exorcist,' " Miller said. "The dog couldn't lay out on the porch."

The problems mounted. "The manure would cover our mailbox," Miller said. "I had to cancel our newspaper because I'd go out to get it and it would be wet and discolored. … I like to take walks but you learned how to time your walks. You can't use your property, can't hang out clothes. You can't barbecue."

Miller said she spoke with the DNR about the problem but the over spraying continued. Three years ago, she gave up and moved. Like Murray, she sold her home to Central Sands Dairy when the farm offered to buy the house.

In a Nov. 18, 2011 internal memorandum, Terence Kafka, a DNR water resource specialist, confirmed that the agency had received numerous complaints from 2008 to 2010 about over spraying by Central Sands Dairy. Staff confirmed Central Sands was spraying too close to homes and private wells.

Craig said Central Sands was not cited for the violations and said the farm has since corrected the problems.

Jeff Sommers, an owner and general manager with Central Sands and also a member of the manure irrigation work group, declined to comment on the complaints from Murray and Miller about the farm's manure irrigation practices.

But Sommers defended the farm's continued use of manure irrigation. He said it now uses a biodigester that reduces the level of phosphorus and pathogens in the manure. He also said the farm follows a nutrient management plan, required of all CAFOs, that prevents over application.

"We do a good job of managing our manure," Sommers said.

Sommers said manure irrigation allows operators to spread applications over the course of the growing season and "allows us to apply at the right time and in the right amount and with the least impact to the environment."

Human health risks

While farmers such as Sommers tout benefits, others worry about public health risks from airborne manure.

Those concerns are high on the list of topics on the manure irrigation working group agenda. In fact, the DNR is paying $338,000 for a two-year study of risks related to drifting manure from the irrigation units.

"We're putting our money where our mouth is," Craig said.

The research is being conducted by Mark Borchardt, a microbiologist with the federal Agricultural Research Service, and Rebecca Larson, a researcher at UW-Madison. Borchardt said researchers are conducting field trials to study the spread of several manure pathogens that can make people sick, including E. coli, salmonella, cryptosporidium and giardia.

Borchardt said the study has three stages. First, it will measure the levels of pathogens at various distances from the irrigation unit. Second, a computer model will track dispersion of the pathogens, taking into account variables such as wind speed, temperature and sunlight. Finally, the pathogen concentrations will be plugged into another computer model that helps scientists assess the risk to humans.

The pathogens, Borchardt said, die as they travel away from their source, killed by sunlight and warmer temperatures. Even letting manure sit in a lagoon for a certain period of time kills some pathogens.

“We’re talking about micro-organisms here, not dust particles,” Borchardt said. “They can die very quickly.”

The research will be used by the manure irrigation work group to consider whether current rules — a restriction on spraying within 500 feet of residences, for example — are adequate.

While the work group will have new and precise science to make decisions related to pathogens and drift, other air quality problems such as ammonia and hydrogen sulfide as well as odor are not being dealt with as thoroughly by the panel, according to critics.

“That’s not the central focus of our work group,” Craig said of air quality issues other than drift and pathogens.

One problem is that much of the scientific data regarding CAFOs and air quality is inconclusive and incomplete. Borchardt, for example, said the drift and pathogen studies his group is conducting are the first of their kind.

In a March 27 letter to Kewaunee Cares (http://kewauneecares.wordpress.com/), an anti-CAFO group, researchers from the John Hopkins Center for a Livable Future (http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/), wrote that “the relationships between intensive livestock operations, air quality, and the health of rural residents are poorly understood.” The letter cited these “data gaps” as reason for more stringent reporting and monitoring by the industrial farms.

Some observers also question the DNR’s ability to exert adequate oversight of manure irrigation. They say it lacks the manpower and authority to make sure that manure spreading plans are followed, irrigation units are operated correctly, and setbacks and other restrictions are followed.

But Craig said the agency’s inspection staff is back to its full force of 11 after months of being down three inspectors. He added, however, that the enforcement process remains largely complaint driven.

It is a system that arguably failed Diane Miller, whose complaints resulted in minimal enforcement action against Central Sands Dairy. She is happy now to be resettled, far away from the dairy in Nekoosa, though her husband, Ray, has since died of cancer.

When Miller thinks of him, she thinks of the house in the country where they lived for so many years. She misses the happier days there.

“It was our home,” she recalled. “It was where I lived with my husband. But it was unpleasant for me to live there anymore.”

This story is part of Water Watch Wisconsin, a project examining water quantity and quality issues across the state. The nonprofit Wisconsin Center for Investigative

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Editor's note, published April 30, 2014: *Christa Westerberg, a Madison attorney who provides legal services to the Wisconsin Center for Investigative Journalism, has represented residents challenging the Wisconsin Department of Natural Resources' handling of manure irrigation. Westerberg provided the Center with publicly available information about the practice. She did not provide the Center with legal services or participate in the writing or editing of this report.*